

# इंटरनेट

# मानक

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Jawaharlal Nehru

“Step Out From the Old to the New”

IS 666-2 (1972): Jig Bushes, Part 2: Renewable Drill Bushes  
[PGD 2: Machine Tool Elements and Holding Devices]



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Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”



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Indian Standard

REAFFIRMED

## SPECIFICATION FOR JIG BUSHES

## PART II RENEWABLE DRILL BUSHES

( Second Revision )

**1. Scope** — Dimensions and requirements for renewable drill bushes and associated liner bushes and locking device. Renewable drill bushes are those intended for insertion in a liner which has been fitted directly into a part of the jig.

**2. Types** — Two types of renewable drill bushes, namely, 'slip' and 'fixed' types have been covered in this standard. Slip renewable bushes are designed to facilitate rapid changing in cases where, for instance, several differing operations and tools are required to follow the same general guide, whereas the fixed renewable bushes are intended to remain in the jig until too worn for further use.

**3. Dimensions**

**3.1 Renewable Drill Bushes** — As specified in Table 1.

**3.2 Liner Bushes** — As specified in Table 2.

**3.3 Locking Screws** — As specified in Table 3.

**4. Material****4.1 Renewable Drill Bushes:**

$d_1 \leq 30$  mm — direct hardening or oil hardening steel.

$d_1 > 30$  mm — direct hardening steel or case hardening steel with a case depth of 0.5 to 0.8 mm and a core strength of 600 MN/m<sup>2</sup>, *Min* (  $\approx 60$  kgf/mm<sup>2</sup>, *Min* ).

**4.2 Liner Bushes** — Suitable steel with a tensile strength of 600 MN/m<sup>2</sup>, *Min* (  $\approx 60$  kgf/mm<sup>2</sup>, *Min* ).

**4.3 Locking Screws** — Mechanical property class 10.9, semi-precision grade (S) of IS : 1367-1967 'Technical supply conditions for threaded fasteners ( first revision )'.

**5. Hardness** — 740 to 820 HV ( 62 to 65 HRC ).

**Note** — Hardness conversion values specified are approximate.

**6. Marking** — Renewable drill bushes and liner bushes shall be marked with the size and tolerance class of the bore.

**6.1 Certification Marking** — Details available with the Bureau of Indian Standards.

Adopted 18 January 1972

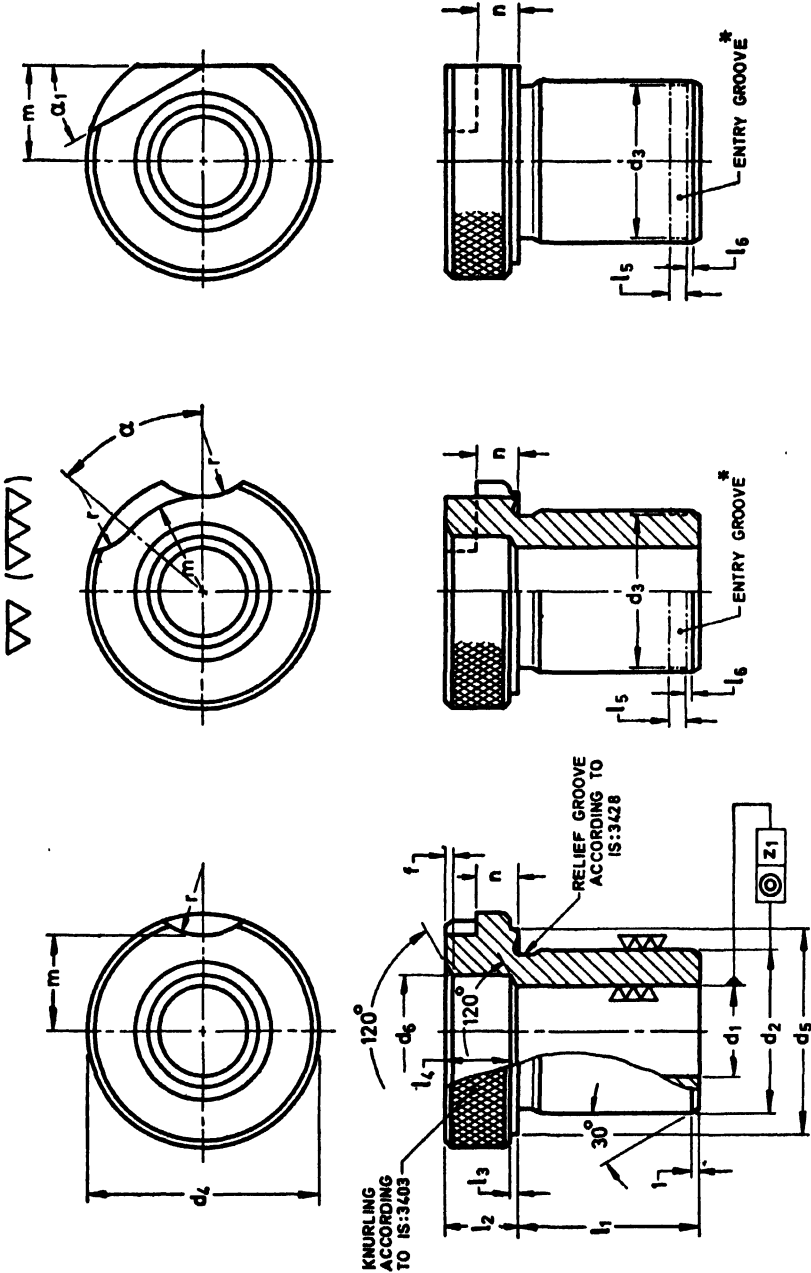
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TABLE 1 DIMENSIONS FOR RENEWABLE DRILL BUSHES

( Clause 3.1 )

All dimensions in millimetres.



Other dimensions and details are same as for Type A

Other dimensions and details are same as for Type A

Other dimensions and details are same as for Type A

TYPE A FIXED RENEWABLE BUSH

TYPE B SLIP RENEWABLE BUSH

TYPE C SLIP RENEWABLE BUSH

**AMENDMENT NO. 2    MAY 1986**

**AMENDMENT NO. 1    APRIL 1980**  
**TO**  
**IS : 666 ( Part II ) - 1972    SPECIFICATION FOR**  
**JIG BUSHES**  
**PART II    RENEWABLE DRILL BUSHES**  
**( *Second Revision* )**

**Corrigenda**

( *Page 3, Table 1, entries under '  $z_1$  '* ) — Substitute ' 0·02, 0·03 and 0·04 ' for ' 0·01, 0·015 and 0·02 ' respectively.

( *Page 4, Table 2, last column, entries under '  $z_2$  '* ) — Substitute ' 0·01, 0·02 and 0·03 ' for ' 0·005, 0·010 and 0·015 ' respectively.

( 3DC 11 )

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**AMENDMENT NO. 2    MAY 1986**  
**TO**  
**IS : 666 ( Part II ) - 1972   SPECIFICATION FOR JIG BUSHES**  
**PART II   RENEWABLE DRILL BUSHES**  
*( Second Revision )*

( Page 5, Table 3 ) — Add the following in the table under respective columns:

$d_9$ $g_8$	$l_8$	$d_{10}$	$d_{11}$	$l_9$	$l_{10}$	$n_1$	$t_1$
M6	3	10	16	10	16.5	2	2.5
M6	5	10	16	10	18.5	2	2.5

( LDC 11 )

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$d_1$ G7	$d_1$ Up to	$d_1$ h6	$d_3$	$d_4$	$d_5$	$d_6$ †	$f$	$l_1$			$l_2$	$l_3$	$l_4$		$l_5$	$l_6$	$m$	$n$	$r$	$z_1$	$\alpha$	$\alpha_1$
								Short‡	Medium	Long†			For $l_1$ Medium	For $l_1$ Long								
—	2·65	8	7·8	15	12	3	0·5	8	12·5	—	8	1	4·5	—	0·8	0·2	5	4·5	7	0·01	65°	40°
2·65	4·75	10	9·7	18	15	5		10	16	25			6	15	1	0·25	6·5					
4·75	8·5	15	14·5	24	20	9	0·8	12·5	20	32	10	1	8	20	1·6	0·3	9	5·5			50°	
8·5	14·0	22	21·4	32	28	14·5		16	25	40			9	24	2·2	0·5	13		9	0·015	30°	
14·0	19·0	28	27·2	40	36	20									2·8	0·6	17	7				
19·0	25·0	35	34	50	46	26	1·2	20	32	50	12	1·5	12	30	3·5	0·8	22				30°	
25·0	33·5	48	44·6	60	56	35									4·5	1	26		11·5	0·02	25°	
33·5	45·0	58	56·2	74	70	47	1·6	25	40	63	16	2	15	38	5·6	1·2	33					

Note — Dimensional deviation for untoleranced dimensions:

Medium class according to IS : 2102-1969 ' Allowable deviations for dimensions without specified tolerances ( first revision ) ' .

\*For slip renewable bushes with  $l_1$  in the short and medium ranges only.

†Bushes with  $l_1$  in the long range have the outside diameter  $d_2$  stepped down to  $d_2 - 0·5$  mm over a length of ( $l_1$  long —  $l_1$  medium) ( see examples of application in Appendix A ).

‡For slip renewable bushes having  $l_1$  in the medium and long ranges only.

§Preferred lengths.

Designation:

a) A renewable drill bush of type B with  $d_1 = 18$  mm,  $d_2 = 28$  mm and  $l_1 = 32$  mm shall be designated as:

Renewable Drill Bush B 18 × 28 × 32 IS : 666 ( Part II )

b) Slip renewable bushes of Type B and Type C can also be provided with entry groove. If entry groove is desired, the same shall be indicated in the designation as:

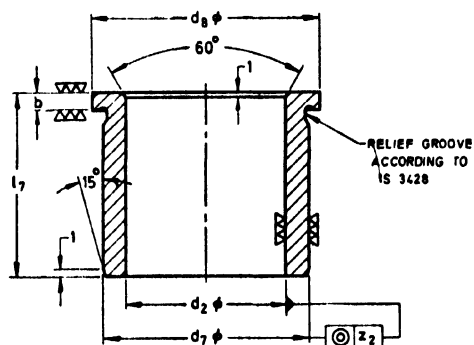
Renewable Drill Bush B ( EG ) 18 × 28 × 32 IS : 666 ( Part II )



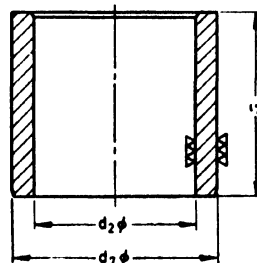
TABLE 2 DIMENSIONS FOR LINER BUSHES

( Clause 3.2 )

All dimensions in millimetres.

 $\nabla \nabla \nabla$  ( $\nabla \nabla \nabla$ )

TYPE A HEADED LINER BUSH

Other dimensions and details  
are same as for Type A  
TYPE B HEADLESS LINER BUSH

$d_2$ H7	$l_1$		$b$	$d_7$ m6	$d_8$	$x_2$
	Short	Long				
8	8	12.5	2	12	15	0.005
10	10	16		15	18	
15	12.5	20		20	24	
22	16	25	2.5	28	32	0.010
28	20	32		36	40	
35			46	50	0.015	
46	25	40	56	60		
58			70	74		

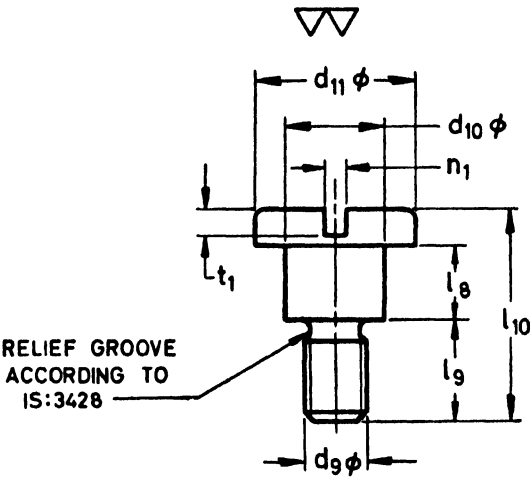
**Note** — Dimensional deviation for untoleranced dimensions:  
Medium class according to IS : 2102-1969

**Designation:**  
A headed liner bush having  $d_2 = 22$  mm and  $l_1 = 25$  mm shall be designated as:  
Liner Bush A 22 × 25 IS : 666 ( Part II )

TABLE 3 DIMENSIONS FOR LOCKING SCREWS

( Clause 3.3 )

All dimensions in millimetres.



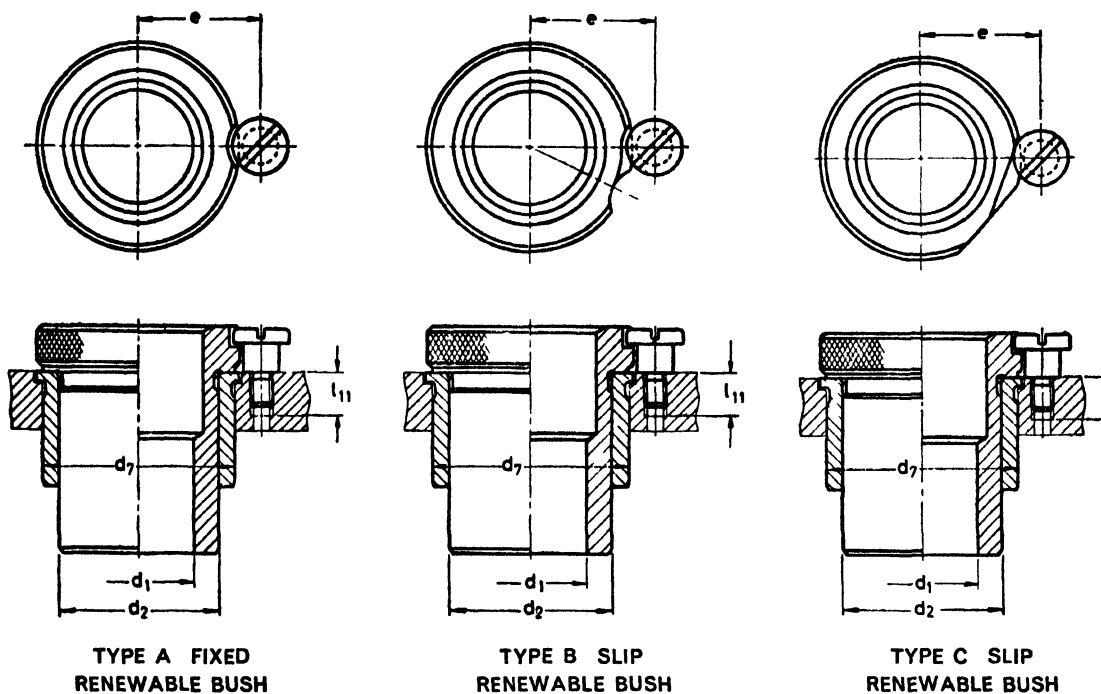
$d_9$ g6	$l_8$	$d_{10}$	$d_{11}$	$l_9$	$l_{10}$	$n_1$	$t_1$
M5	5	7.5	12	8	15.5	1.6	2
M6	6	10	16	10	19.5	2	2.5
	7.5				21		
M8	10	13	20	12	27	2.5	3

**Note** — Dimensional deviation for untoleranced dimensions:  
Medium class according to IS : 2102-1969.

**Designation:**  
A locking screw with  $d_9$  = M6 and shoulder length  $l_8$  = 7.5 mm shall be designated as:  
Locking Screw M6  $\times$  7.5 IS : 666 ( Part II )

**APPENDIX A**

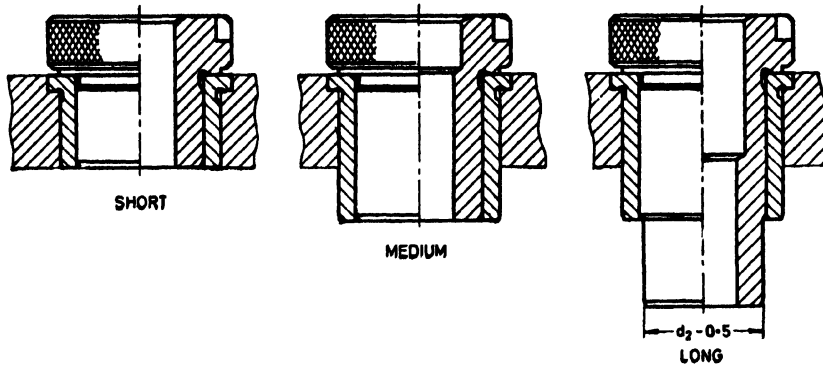
( Footnote Under Table 1 )

**EXAMPLES OF APPLICATION OF RENEWABLE DRILL BUSHES****A-1. Fixing Method**

All dimensions in millimetres.

Renewable Drill Bush			Liner Bush		●	$l_{11}$ Min	Locking Screw
$d_1$ G7		$d_3$ h6	$d_2$ H7	$d_7^*$ m6			
Over	Up to						
—	2.65	8	8	12	11.5	10	M5 × 5
2.65	4.75	10	10	15	13.0		
4.75	8.5	15	15	20	17.5		
8.5	14	22	22	28	21.5	12	M6 × 6
14.0	19	28	28	36	25.5		M6 × 7.5
19.0	25	35	35	46	31.0		
25.0	33.5	46	46	56	37.0	15	M8 × 10
33.5	45	58	58	70	44.0		

\*Tolerance zone of bore  $d_3$  in jig plate = H7

**A-2. Length of Bushes( $l_1$ )****EXPLANATORY NOTE**

This standard was first published in 1963, covering the requirements of headed and headless type of jig bushes and slip bushes. The details of form of the heads pertaining to the slip bushes were omitted in the earlier standard in order to permit improvement in design. With advancement of new technical knowledge in the locking of jig bushes, it has been decided to standardize slip bushes with locking arrangement. The standard on jig bushes is now issued in the following two parts:

Part I — Headed and headless jig bushes; and

Part II — Renewable drill bushes.

**Renewable Drill Bushes**—Fixed renewable drill bushes, Type A, have milled out portion at the head with which they can be securely locked in the jig plate by means of locking screws. Types B and C are slip renewable bushes with alternate form of heads for locking arrangement. Dimensions have been so chosen so that the three types of renewable drill bushes can be made from the same blank and the same locking screw can be used for locking the bushes.

In order to assure that the twist drill is properly guided, the shoulders for the bush  $d_1$  are provided with  $120^\circ$  chamfer. For proper introduction of the drilling bush in the liner bush, a chamfer of  $30^\circ$  is provided at the outside diameter  $d_2$ .

Types B and C slip renewable bushes can also be provided with an entry groove. This permits very quick entering, but it must be protected against damage and dirt. This means that it must not project beyond the liner bush.